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EARNED VALUE MANAGEMENT PLAN for

Department of Energy I-MANAGE Program

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Approvals

The following people have approved this document. (Sign below name)

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Distribution

This document has been distributed to:

Name	Function

Earned Value Management Plan

1. Purpose and Objectives

1.1. The purpose of this document is to establish I-MANAGE Program guidance and direction for a consistent method of compliance with the ANSI/EIA 748-A-1998[1] Standard: Earned Value Management Systems (EVMS) and the Department of Energy's DOE M 413.3-1 Project Management for the Acquisition of Capital Assets, dated March 28, 2003. Using this document as a guide, projects within the I-MANAGE portfolio that exceed the total lifecycle budget threshold set by OMB and/or the Department of Energy (DOE or the Department) must establish project plan, schedule, and budget controls that align with the guidelines and direction provided herein.

1.2. The objectives of this document include:

1.2.1. To provide guidance in how projects will integrate project scope with schedule and cost elements to optimize project and program planning and control.

1.2.2. To provide guidance in establishing reporting requirements at the project and program level for project performance, variance from plan, forecasting of impacts, and estimation of project completion dates and cost.

1.2.3. To ensure that projects have in place an "early warning system" of project performance that clearly identifies and separates schedule and cost variances to objectively ascertain the true status of a project.

2. General Background Information

2.1. There are three factors that shape every project:

2.1.1. Scope: The Project Management Institute[2] (PMI) defines scope as "the sum of the products and services to be provided as a project." Project scope may be referred to as the project *work.*

2.1.2. Time: The time required to deliver project scope. This may be referred to as *duration*, i.e. the duration of time required to complete a project, or individual tasks that taken together, complete the work of the project.

[1] ANSI/EIA 748-A-1998, Published by ©Electronic Industries Alliance 1998, Technology Strategy and Standards Department. Approved May 19, 1998; reaffirmed August 28, 2002.

[2] The Project Management Institute (PMI) has world-wide recognition is the pre-eminent body of project management practitioners and experts. PMI is the publisher of *A Guide to The Project Management Body of Knowledge (PMBOK®) – 2000 Edition.*

2.1.3. Money: The cost of *resources,* or the people, equipment, and materials required to complete project activities necessary to deliver project scope.

2.2. The combination of these three variables comprises what is often referred to as the *project triangle*. This can be represented as an equation:

2.2.1. There are three variables in the equation: W (scope or work), D (time or duration), and R (money or resources).

2.2.2. The equation becomes: **W = D * R**

2.2.3. In other words, the amount of work that can be accomplished (scope) is equal to the duration (time) * the number of resources (who have an inherent cost).

2.3. By assigning values to one variable in the equation, you can adjust the other two and "solve" the equation (i.e. assign values to the variables). By assigning values to two variables in the equation, you can determine the value of the third. Following are a few examples.

2.3.1. Fixed work / fixed duration. Work (W) and duration (D) are pre-defined, and the project manager must determine resource (R) requirements.

2.3.1.1. W = install new network server for Secretary's office. This is the scope of the project, and cannot change.

2.3.1.2. D = must be done in 4 weeks (40 hours available per week). This is a management objective, and for planning purposes, we assume it cannot change.

2.3.1.3. R = TBD – the project manager must determine how many resources will be required to accomplish the work required. Detailed planning indicates that this will require:

- New server (@ $1,000.00)
- Two network engineers full time (@ $25.00 per hour for 160 hours = $25.00 * (2 * 160) = $25.00 * 320 = $8,000.00).
- One electrician ½ time from the beginning of the project (@ $50.00 per hour for 80 hours = $4,000.00).
- Two desktop technicians full time beginning 2 weeks after the start of the project (@ $15.00 per hour for 80 hours = $15.00 * (2 * 80) = $15.00 * 160 = $2,400.00.

2.3.1.4. Thus, the total budget of the project would be $15,400 to install the new network server for the Secretary's office.

2.3.2. Fixed work / fixed resources. Work (W) and resources (R) are pre-defined, and the project manager must determine the duration (D).

2.3.2.1. W = install new network server for Secretary's office.

2.3.2.2. R = available resources include:

- New server
- One network engineer full time.
- One electrician ½ time.
- Two desktop technicians as necessary.

2.3.2.3. Duration = TBD – the project manager determines that the network engineers will be the critical path, constrained resource, and that the project will take 60 days.

2.4. You should not try to fix all variables in the equation. While it is possible to arbitrarily pre-define all 3 variables, this may constitute an impossible situation. For example, the following may not be possible:

2.4.1. Resources (R) = one network engineer, one electrician (½ time), and one desktop technician.

2.4.2. Work (W) = install new network server for Secretary's office.

2.4.3. Duration (D) = one week.

3. Earned Value Concepts

3.1. Earned value analysis involves calculation of three key values for each project activity.

3.1.1. Planned value (PV) is that percentage of the approved budget planned to be spent on an activity during a given period.

3.1.2. Actual cost (AC) is the actual cost of work performed during the given period of performance.

3.1.3. Earned value (EV) is the value of the work actually completed on the activity during the period of performance.

3.2. These three values are used to calculate a number of performance metrics. The metrics are represented as positive or negative dollar amounts, or positive or negative percentages.

3.2.1. Cost variance (CV) is a metric for cost performance. It is typically represented as a positive or negative dollar amount, where a positive amount is considered favorable, and a negative amount unfavorable. It is calculated using the following equation:

CV = EV - AC

3.2.2. Schedule variance (SV) is a metric for schedule performance, and as with CV, is represented as a positive or negative dollar amount. A positive amount is considered favorable, and a negative amount unfavorable. It is calculated using the following equation:

SV = EV - PV

3.2.3. The cost performance index (CPI) represents the cost efficiency ratio of earned value to actual costs, and is represented as a percentage. A CPI of 100% or more is normally favorable, while less than 100% is normally unfavorable. It is calculated using the following equation:

CPI = EV/AC

3.2.4. The schedule performance index (SPI) represents the schedule efficiency ratio of earned value to planned value, and is represented as a percentage. An SPI of 100% or more is normally favorable, while less than 100% is normally unfavorable. It is calculated using the following equation:

SPI = EV/PV

3.2.5. The budget at completion (BAC) is the total approved planned value for the project. This would include the original total planned value, and any approved changes to the project budget baseline.

3.2.6. The estimate at completion (EAC) uses the budget at completion (BAC) adjusted by the cost performance index (CPI) to project a more accurate total final cost to complete the project:

EAC = BAC / CPI

3.3. While these performance metrics are calculated against individual project activities, management reporting needs will typically require summarization to a higher level.

3.4. In the following sections, activities that should be performed to establish and maintain an EVMS that adheres to the ANSI/EIA 748-A-1998 Standard are indicated as follows:

3.4.1. ☑. This symbol indicates that some activity should be completed, and/or a work product or deliverable should be developed.

3.4.2. In addition, the **group responsible** for performing the activity, or developing and providing the work product or deliverable will be **bolded** for clarity.

4. Project Level Earned Value Management Plan

4.1. The ANSI/EIA 748-A-1998 Standard: Earned Value Management Systems (EVMS) provides "basic guidelines for companies to use in establishing and applying an integrated Earned Value Management System". These EVMS Guidelines were grouped into 5 categories to establish a framework for further discussion.

4.2. These same EVMS Guidelines[3] were approved as 32 distinct *Earned Value Management Criteria* by the Department of Defense, in the same 5 categories.

4.3. In addition, these same EVMS Guidelines were also listed as 32 distinct EVMS Criteria by the Department of Energy[4]. This common structure will be used as the basis for this document.

4.4. The five categories of criteria are:

4.4.1. Organization

4.4.2. Planning, scheduling, and budgeting

4.4.3. Accounting considerations

4.4.4. Analysis and management reports

4.4.5. Revisions and data maintenance

4.5. The I-MANAGE Program will establish a consistent approach to application and administration of earned value management based on these categories. This approach will be used by each project within the I-MANAGE portfolio. To formalize and document the inclusion of earned value management within each project, a separate earned value management (EVMS) plan should be developed for each project, based on the guidelines herein. Wherever possible, the EVMS Plan should incorporate this guidance by reference rather than duplicating available information.

4.6. ☑ **Each individual I-MANAGE Project Team should develop a project specific Earned Value Management Plan**. The plan should be based on the guidelines and directions established in the following sections (grouped by the five categories above), with project specific information as appropriate.

5. Organization

5.1. **Criterion # 1:** Define the authorized work elements for the program. A work breakdown structure (WBS[5]), tailored for effective internal management control, is commonly used in this process.

[3] Page 3, ANSI 748-A-1998; Earned Value Management Implementation Guide, Defense Contract Management Command (DCMC), revision number 1, October 3, 1997

[4] Section 12.7 Criteria Concept, DOE M 413.3-1, March 28, 2003.

5.1.1. ☑ **The I-MANAGE Program Office should define or ensure that an SOW exists prior to project initiation for each individual project.** The starting point of every WBS should be a defined statement of work (SOW). The SOW will establish the high level scope of the project, and should define the functional business requirements to the greatest extent possible.

5.1.1.1. Where the project is based upon a procurement award, the high level SOW may be defined by the procurement vehicle (purchase order or contract).

5.1.1.2. The SOW should identify responsibilities and dependencies for both the supplier – the provider of goods or services, either external (i.e. contractor) or internal, and the customer the receiver of goods or services.

5.1.1.3. If work scope is defined in general terms, additional time and resources may be required within the project planning process as a risk mitigation strategy.

5.1.1.4. The SOW should establish, at a minimum, the first two levels of the WBS. For example, consider the following:

5.1.1.4.1. The SOW identifies the product (or service) the project will deliver. This is level 1 of the WBS.

5.1.1.4.2. The SOW is then sub-divided into major tasks, each identified by a *Task Performance Objective*, where each Task Performance Objective has a unique ID. This represents level 2 of the WBS. Within each Task Performance Objective, the SOW identifies a set of specific deliverables or work products that must be completed before the given Task Performance Objective is considered completed.

5.1.1.4.3. These deliverables or work products are completed as the result of sub-tasks within the given Task Performance Objective, and represent level 3 of the WBS.

5.1.1.4.4. For the STARS Project this would be represented as follows:

- Level 1 is associated with the product of the STARS Project, which is a fully implemented

[5] The Project Management Institute (PMI) defines a work breakdown structure (WBS) as "a deliverable oriented grouping of project components that organizes and defines the total scope of the project".

Oracle Federal Financial Applications System, identified as the primary deliverable of the SOW.

- Level 2 would be individual task performance objectives associated with STARS, e.g. STARS Redesign – P.O. Task Performance Objective 3130; STARS Development – P.O. Task Performance Objective 3140; STARS Acceptance Test P.O. Task Performance Objective 3150; STARS Deployment – P.O. Task Performance Objective 3160; STARS Post-Deployment – P.O. Task Performance Objective 3170.
- Level 3 would be the major deliverables under each Task Performance Objective as specified in the SOW. For example, within Task Performance Objective 3130, the new requirements baseline would be one of several deliverables that must be successfully completed to signify successful completion of 3130.

5.1.2. In this example, the P.O. Task Performance numbers should be used as the summary level *control account*[6], and the WBS code structure should evolve from there. For example, 3130 would designate level 2 items within the WBS; the level 3 designation could be 3130.001, 3130.002, 3130.003 or some other unique numbering scheme. Each project will identify the numbering scheme within the project level Earned Value Management Plan.

5.1.3. The SOW may contain a high level OBS, with general resource levels and costs. Individual resources, or groups of resources within the OBS may be associated with the P.O. Task Performance Order numbers, with a more detailed breakdown at lower levels of the WBS.

5.1.4. ☑ **The individual I-MANAGE Project Management Team should develop a work breakdown structure at a level that meets the needs and requirements of the project, organization, and contractual agreements.** This should be done during the initiation phase of each project.

[6] ANSI/EIA 748-A-1998 defines a control account as "a management control point at which budgets (resource plans) and actual costs are accumulated and compared to earned value for management control purposes. ...it represents the work assigned to one responsible organizational element on one program work breakdown structure element."

5.1.4.1. The WBS is a multi-level hierarchical breakdown tied to specific work products and deliverables, with project costs summarized from the lower WBS items.

5.1.4.2. As discussed above, the WBS should have a control account numbering scheme directly related to the Contract or Purchase Order Task Performance Numbers from the SOW to simplify tracking and reporting. The control account will be used to link the WBS to an owning manager who will be accountable for work performance.

5.1.4.3. By linking the control accounts (associated with individual items in the WBS) back to the contract or purchase order, costs can be rolled up to the ceiling (obligation) controls at the P.O. level. The control account effectively integrates project scope, schedule, and costs, and simplifies control and management.

5.1.4.4. The organization should establish the size and duration of control accounts (and hence, levels and detail of items within the WBS hierarchy) by considering the specific planning and control needs of each individual project.

5.1.4.5. As a project progresses from one phase to another, it may be necessary to further decompose a WBS to a more detailed level based on information provided during the preceding phase(s).

5.1.4.6. Items not represented in the WBS are, by definition, outside the scope of the project.

5.2. **Criterion # 2:** Identify the program organizational structure including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.

5.2.1. ☑ **The individual I-MANAGE Project Management Team should develop an organizational breakdown structure (OBS) at a level that meets the needs and requirements of the project, organization, and contractual agreements.** This should be done during the initiation phase of each project.

5.2.2. The OBS is a multi-level hierarchical breakdown which includes internal (employee) and external (contractor) staff tied to specific work products and deliverables, and should identify the organizational elements in which work will be planned and controlled.

5.2.3. Where appropriate, the OBS should identify the organization or function responsible for controlling indirect costs (commonly referred to as "overhead" or "burden").

5.2.4. Resources may be directly assigned to the project on a full-time basis, or detailed from other organizational units on a full or part-time basis.

5.2.4.1. There is less risk when project assignments involve full-time, direct project resources (i.e. projectized).

5.2.4.2. Where project resources are indirect (i.e. matrixed), additional time (schedule) and budget (resource costs) should be considered as a risk mitigating strategy.

5.2.5. The OBS should clearly establish work assignments and responsibilities.

5.2.6. The OBS may change as the project evolves, and depending on the reason for change (planned vs. unplanned), may be controlled through the project change management process.

5.2.7. Where work will be subcontracted, the organization will require that prime or critical contractors comply with the policies and procedures for EVMS as established by the I-MANAGE Program Office and individual project team.

5.2.7.1. Reporting requirements should be consistent with the size and nature of the sub-contracting effort.

5.2.7.2. The exception would be project activities conducted under a firm fixed price (FFP) contract, in which case the sub-contractor will provide cost reporting, and should be required to provide schedule, technical, and progress status reports.

5.3. **Criterion # 3:** Provide for the integration of the company's planning, scheduling, budgeting, work authorization, and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and program organizational structure.

5.3.1. ☑ **The individual I-MANAGE Project Management Team should develop a work authorization process to approve expenditure of effort or purchase of materials linked to the approved WBS based on agreement between the client and contractor project management.** This should be done during the initiation phase of each project.

5.3.2. By linking the WBS, OBS, and SOW, this criterion is effectively met. The SOW provides the high level schedule and budget. The timing for initiation of specific project activities would be driven by individual project management team.

5.3.3. For project activities completed by the contractor, the SOW provides the Task Performance IDs, which are used to establish budgets and accumulate costs for invoicing purposes. Work is authorized based on the obligation of funds for each individual Task Performance Objective. Costs

are accumulated based on the submission of approved timesheets, or other invoices approved in advance by the client.

5.3.4. In the approach we've outlined, the SOW provides the highest two levels of the WBS, and is linked to the OBS as well, since the budgeted amounts were based on the result of resources * rates over time.

5.4. **Criterion #4:** Identify the company organization or function responsible for controlling overhead (indirect costs).

5.4.1. ☑ **The I-MANAGE Program Office should assume responsibility for controlling overhead (i.e. indirect costs) associated with each project within the I-MANAGE Portfolio.**

5.4.1.1. Each project should identify the resources (i.e. direct costs) and track the actual costs associated with project work done by the resource, or the cost of the resource (materials). Resources should be clearly identified during the planning process, with related costs.

5.4.1.2. Indirect costs should be pooled, controlled, allocated, and reported by the I-MANAGE Program Office. These costs should not be part of the earned value tracking by individual I-MANAGE projects.

5.5. **Criterion #5:** Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule measurement by elements of either or both structures as needed.

5.5.1. ☑ **The individual I-MANAGE Project Management Team should integrate the WBS and OBS (e.g. use a cross-walk table that links the organizational unit or resource ID with the WBS item ID) so that cost and schedule performance may be measured and reported by either structure.**

5.5.2. With the WBS, cost and schedule performance would be tied to specific products or deliverables associated with *work packages*[7] or *planning packages*[8] , or summarized to higher levels of the WBS by rolling up cost and schedule performance data. As discussed previously, this is linked to the Task Performance IDs in the SOW.

5.5.3. With the OBS, cost and schedule performance would be tied to individual organizational elements through the relationship with the WBS, and would

[7] PMI defines a work package as "a deliverable at the lowest level of the WBS, when that deliverable may be assigned to another project manager to plan and execute". The ANSI/EIA 748-A-1998 defines a work package as "a task or set of tasks performed within a control account".

[8] ANSI/EIA 748-A-1998 defines a planning package as "a logical aggregation of work, usually future efforts that can be identified and budgeted, but which is not yet planned in detail at the work package or task level.

be summarized to higher levels of the OBS by rolling up cost and schedule performance data.

6. Planning, Scheduling, and Budgeting

6.1. **Criterion #6:** Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.

6.1.1. ☑ **The individual I-MANAGE Project Management Team should develop and maintain a detailed project schedule.** The detailed activities reflected in the schedule should be traceable back to the WBS through the WBS numbering scheme. The steps required for development of a detailed project schedule[9] must be integrated with cost objectives to provide resource planning and performance measurement.

6.1.2. Depending on the size and overall duration of the project, detailed schedule development may involve progressive refinement of the master schedule. For example, while the general steps required for transition to production of a complex IT system are known, the actual timing of the deployment activities may be postponed until after the project development activities have ended, and the user acceptance testing is underway. The development activities are known, planned, and scheduled in a detailed manner, and are defined as work packages. The deployment activities are less clear, and will be defined as planning packages, awaiting further definition.

6.1.3. The schedule will define the sequence of project activities, interdependencies, and the work products / deliverables or milestones that will indicated performance against scheduled activities.

6.1.4. Interrelationships between the detailed project schedule and other related projects (defined dependencies exist) should be tracked by each individual project. This may include internal (e.g. other Departmental projects) or external relationships (sub-contractor schedules).

6.2. **Criterion #7:** Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

6.2.1. ☑ **The individual I-MANAGE Project Management Team should link work products and / or project deliverables with project activity milestones.** This will build upon the outcome of achieving Criterion #6 above.

[9] A definition of the processes for development of a detailed project schedule are outside of the scope of this document. For more information, please refer to the Project Management Body of Knowledge.

6.2.2. This should tie directly to the WBS. The work products and deliverables will be directly related to the higher level work products and deliverables in the SOW, however, the SOW may not list every single work product and deliverable associated with specific work packages.

6.2.3. On the project plan, the outcomes of specific activities will be specific work products and/or deliverables. There must be a clear link between the two.

6.2.4. Having said this, the identification and definition of detailed work products or deliverables must not result in additional scope without the approval of the project management, and any changes to scope must be addressed through the integrated change management process.

6.3. **Criterion #8:** Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. On government contracts, if an over target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.

6.3.1. ☑ **The I-MANAGE Program Office should ensure that the SOW includes a master schedule with established budgetary ceilings.** As with project scope, the starting point of the project schedule and budget should be a defined statement of work (SOW).

6.3.1.1. The SOW will establish the master schedule of the project based upon key project and contractual requirements, as well as the management needs of the Department.

6.3.1.2. Budgetary ceilings may be established by the OMB Circular A-11, Exhibit 300 submission. When this is the case, any changes to these ceilings must be approved by OMB[10].

6.3.1.3. Schedule and budget planning are fundamental to basic project management. A program schedule provides a time phased plan for providing the product or service of a project, while the budget signifies the planned expenditure of company resources (materials and resource time). Each must be integrated with the scope of the project to ensure effective project / earned value management.

[10] See sections 1.H.2 and 1.H.3 of the Exhibit 300 template.

6.3.2. ☑ **The individual I-MANAGE Project Management Team, using the detailed project schedule developed previously, should assign project resources and resource rates against the schedule to provide the detailed, time-phased budget.**

6.3.2.1. This is standard functionality within project management software applications, which provides the ability to develop a schedule, establish task / activity interdependencies, define resources and rates, and assign resources to tasks and/or activities.

6.3.2.2. The sum of the budgets must link to the master schedule and budget provided by the I-MANAGE Program Office, and if appropriate, incorporated within the Exhibit 300 for the project.

6.3.2.3. ***However, the numbers in the detailed time-phased budget may not match the master schedule and budget to the penny.*** By the nature of the process, it is not possible to ensure that the numbers match to the penny, given that the original master budget is often derived from estimated work efforts while the detailed schedule is typically built from the ground up and much closer to reality. The Exhibit 300 process recognizes this distinction, and provides the ability to revise requested funding levels (risk adjusted cost estimates) on future submissions as information evolves over time.

6.3.2.4. Depending on the length of the project, later activities may be summarized to a higher level budget pending decomposition at a later date as better information becomes available. As discussed previously, these are labeled "planning packages".

6.3.3. ☑ **The individual I-MANAGE Project Team will ensure that the project schedule and budget is *baselined*[11].**

6.3.3.1. The project schedule and budget plans should be reviewed and approved through the project management team, and the I-MANAGE Program Office.

6.3.3.2. This constitutes the ***performance measurement baseline.***

6.3.3.3. Once approved, they are baselined for earned value management reporting. In effect, the budgeted cost(s) become the planned value for earned value calculations.

[11] PMI defines a baseline as "The original approved plan (for a project, a work package, or an activity), plus or minus approved scope changes".

6.3.3.4. Obviously, as the project progresses, planning packages will be further refined, and these newly defined activities would be added to the existing baseline through a scheduled, controlled process.

6.3.3.5. Any changes to the summary project baseline, as defined by the higher level budgets established in the SOW, would constitute a rebaselining that may or may not require OMB approval. Please refer to the specific Exhibit 300 associated with the specific project.

6.3.4. ☑ **The individual I-MANAGE Project Management Team should notify the I-MANAGE Program Office when the development of the detailed time-phased budget results in an over-target baseline.**

6.3.4.1. This would occur when the detailed schedule and budget derived during the detailed planning process indicates a budget requirement greater than the management budget targets established in the SOW.

6.3.4.2. This determination would occur based on variances between individual Task Performance Objectives, not the project aggregate.

6.4. **Criterion #9:** Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.

6.4.1. ☑ **The individual I-MANAGE Project Management Team should classify resources assigned to project activities by resource type (labor, material, etc.).**

6.4.2. Unlike major Department of Defense projects, this should not be an issue for I-MANAGE projects, given the nature of the activities, since nearly all of our costs will be labor related.

6.4.3. The costs should be traceable through the WBS numbering scheme.

6.5. **Criterion # 10:** To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.

6.5.1. ☑ **The individual I-MANAGE Project Management Team should ensure that the detailed schedule / time-phased budget identify activities for which completion is quantifiable and verifiable.**

6.5.1.1. The activities will be assigned to specific members of a project team, and there must be some way to measure and ensure successful completion of a given activity.

6.5.1.2. Project team members will begin assigned tasks on the scheduled start date unless otherwise directed by their immediate supervisor, and will track actual hours expended on the assigned tasks using the WBS numbering scheme provided by their team leader.

6.5.1.3. Each team leader will work with the project management to identify WBS items and sub-items for which their team is authorized to work.

6.5.1.4. The value of the activity will be the total cost of the resources required to complete the activity.

6.5.1.5. As described earlier, future *planning packages* will be decomposed at a later date.

6.6. **Criterion # 11:** Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.

6.6.1. ☑ **The individual I-MANAGE Project Management Team should add up the total of the detailed work package budgets and the future planning package budgets and match against the total control account budget.** Please see item 6.3.2.3 above. The degree of accuracy should be extremely close. However, given that the process begins as "top down" with the SOW establishing management targets, and then changes to "bottoms up" with the project managers developing detailed project plans, it may not reasonable to expect 100% accuracy.

6.7. **Criterion # 12:** Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort.

6.7.1. ☑ **The individual I-MANAGE Project Management Team will ensure that *level of effort*[12] (LOE) activities are clearly identified.** In general, designation of level of effort activities should be minimized to the greatest extent possible. In cases where LOE is necessary, a time phased budget must be established for control and reporting purposes.

6.7.2. Normally, this would be for administration or support activities which do not allow for easy definition. For example, the Database Administration

[12] ANSI/EIA 748-A-1998 defines level of effort as "unmeasured effort of a general or supportive nature usually without a deliverable end product. Examples are supervision, program administration, and contract administration.

(DBA) support for the STARS Project will include elements that can be measured, and elements not easily measured.

6.7.2.1. The DBA's must develop documentation for backup and recovery of the system database. This is measurable, with estimated resources and effort. It can be defined as a standard work package within the STARS Project WBS.

6.7.2.2. The DBA's must also provide some level of ad-hoc support for the various STARS Project Teams to answer technical questions, and provide other DBA related support. The frequency and effort associated with this is variable and not easily estimated. Thus, a LOE work package would be assigned to the DBA team with some percentage of their time allocated. The value of this time would be equal to the cost of the resource times the fraction of time allocated.

6.7.2.3. Earned value would be equal to the planned value, and the cost variance, i.e. planned value minus actual value. There would be no schedule variance for LOE.

6.8. **Criterion # 13:** Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.

6.8.1. ☑ **The I-MANAGE Program Office should assume responsibility for overhead cost pools.**

6.8.2. ☑ **The individual I-MANAGE Project Management Teams should directly cost all project resources, either through assignment to discrete work packages or through level of effort activities.**

6.9. **Criterion # 14:** Identify management reserves and undistributed budget.

6.9.1. ☑ **The I-MANAGE Program Office should assume responsibility for the control and administration of management reserves.**

6.9.2. Management reserves are contingency funds controlled at a level above the project management team. By definition, this would be the I-MANAGE Program Office.

6.9.3. Individual I-MANAGE Project Management teams may elect to add contingency time to tasks or activities within the detailed project schedule, but this should not be confused with management reserves.

6.10. **Criterion # 15**: Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

6.10.1. ☑ **The I-MANAGE Program Office should control the program level budgets by summing individual project budgets and management reserves.**

6.10.1.1. This criteria must be met by the I-MANAGE Program Office, which will have effective visibility into individual I-MANAGE Project budgets, expenditures, and management reserves.

6.10.1.2. At the direction of the I-MANAGE Program Office, each individual I-MANAGE Project will provide scheduled reporting with sufficient information to satisfy this criterion.

7. Accounting Considerations

7.1. **Criterion # 16:** Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

7.1.1. ☑ **The individual I-MANAGE Project Management Teams will ensure that direct contractor costs are captured and recorded by control account.**

7.1.1.1. Direct contractor costs, as invoiced to the Department and subsequently recorded in the Department's accounting system of record, should be tied to elements within the WBS, which will tie back to the OBS.

7.1.1.2. The majority of costs will be based on the submission of timesheets which should record contractor hours accurately linked to individual items within the WBS coding scheme.

7.1.1.3. Other direct charges (software, material, or other) should be invoiced as a separate line item, and itemized separately on the WBS. Actual costs should not be recorded prior to submission of the invoice, or actual receipt of the material. The approach to be taken should be clearly defined in the project EVMS Plan.

7.1.2. ☑ **The individual I-MANAGE Project Management Teams Contracting Officer's Representative (COR) should ensure that contractor invoices are recorded in a manner captured in the Department's accounting system through account code values that can be linked directly to the individual project budgets.**

7.1.2.1. This is accomplished through the use of the Task Performance Objective numbers.

7.1.2.2. All submitted invoices must indicate the Task Performance Objective for which costs are submitted.

7.1.3. ☑ **The I-MANAGE Program Office should establish policies and procedures for recording internal (Federal) costs within the Department's accounting system through account code values that can be linked directly to the individual project budgets.**

7.1.4. ☑ **In the project EVMS Plan, individual I-MANAGE Project Management Teams will document policies and procedures for recording direct costs for federal resources assigned to the individual project, based upon guidance from the I-MANAGE Program Office.**

7.1.4.1. Each I-MANAGE Project Management Team will work with the I-MANAGE Program Office to establish specific policies and procedures to identify and record direct costs of federal resources assigned to the project.

7.1.4.2. In most cases, these costs will be based on the capture of federal labor hours accurately linked to individual items within the WBS coding scheme

7.2. **Criterion # 17:** When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.

7.2.1. By progressively decomposing the high-level WBS from the SOW to the detailed WBS used on the individual project, it is not possible to allocate a single control to more than one WBS element.

7.2.2. The approach described throughout this document will ensure that this criterion is satisfied.

7.3. **Criterion # 18:** Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.

7.3.1. ☑ **The individual I-MANAGE Project Management Teams will ensure that direct contractor costs are captured and recorded by control account, and a single control account cannot be allocated to two or more organizational elements.**

7.3.1.1. The project managers must ensure that each team has unique numbers within the WBS numbering scheme. Timesheets will be constructed based on this numbering scheme, and approved timesheets will be used as the source of data for invoice submission.

7.3.1.2. Using this approach, the individual control accounts will be related to individual organizational elements, satisfying this criterion.

7.4. **Criterion # 19:** Record all indirect costs which will be allocated to the contract.

7.4.1. All costs associated with the current I-MANAGE prime contractor will be recorded as direct costs without allocation, and invoiced accordingly.

7.4.2. ☑ **The I-MANAGE Program Office should provide guidance on policies and procedures for capturing and allocating indirect costs for federal resources assigned to the individual project.**

7.5. **Criterion # 20:** Identify unit costs, equivalent unit costs, or lot costs when needed.

7.5.1. ☑ **The individual I-MANAGE Project Management Teams will ensure that direct contractor costs are captured and recorded by control account, and that hours or unit cost per resource category are provided on the invoice.**

7.5.1.1. This criterion will be satisfied by the approach described.

7.5.1.2. The IBM contract with the Department of Energy specifies resource rates (unit costs per resource category), and fixed price costs for hardware and software by license fee (seat licenses, where a single seat price would constitute a unit cost).

7.6. **Criterion # 21:** For EVMS, the material accounting system will provide for:

- Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques.
- Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material.
- Full accountability of all material purchased for the program including the residual inventory.

7.6.1. These sub-criteria will be satisfied by the approach described.

7.6.2. As a general statement, the projects in question will deal primarily with labor resources and not material resources.

7.7. Please note that the EVMS ***is not*** an accounting system, and these guidelines do not suggest changes to the Department's standard accounting practices.

8. Analysis and Management Reports

8.1. **Criterion # 22:** At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system:

- Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.
- Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.

8.1.1. ☑ **The Project Management Team for each I-MANAGE Project should ensure that actual effort, start dates, and end dates are entered for each project activity within the project level WBS as individual activities begin or end.**

8.1.1.1. Once the project budget and schedule are baselined, the Project Management Team is responsible to ensure that actual effort, start and end dates are entered for each activity.

8.1.1.2. This data is essential to establish whether schedule variances exist.

8.1.2. ☑ **The Project Management Team for each I-MANAGE Project should ensure that earned value is recorded against individual activities in progress.**

8.1.2.1. Determination of earned value is dependent on the type of activity.

8.1.2.2. For activities with defined scope of work (called "discrete" effort by ANSI/EIA 748-A-1998), the project team may calculate earned value by using the following:

- An objective assessment by assigning value to sub-activities within an individual activity, and assign a percentage of the value to be recognized when the sub-activity is complete. The full value of the activity cannot be recognized until all sub-activities are complete. This is referred to as the "valued milestone" approach.
- A subjective management assessment may be applied to determine the percentage of work completed for a sub-activity or activity, which is then applied to the total budget for the activity to calculate the earned value. This may be based upon metrics for work measurement (e.g. lines of code).

- In general, the objective approach is preferred. The ANSI/EIA Standard indicates a note[13] of caution to "avoid artificial constraints on earnings such as a percentage limit on earnings in a work package pending closure of the ending milestone".

8.1.2.3. For level of effort activities, this is simply a comparison of budget to actual cost.

8.1.3. ☑ **The individual I-MANAGE Project Management Teams should provide monthly performance reports for the I-MANAGE Program Office which identify the schedule and cost variance.**

8.1.3.1. Measures should include schedule variance, cost variance, the cost performance index, and the schedule performance index.

8.1.3.2. For contractor related activities, the information should be based on actual costs as derived from submission of timesheets, or receipt and invoicing of software or other materials.

8.1.3.3. The information must be reconcilable back to the invoice which is recorded in the Department's accounting system of record.

8.1.3.4. The submission of the invoice may be based on timesheets that overlap calendar months.

8.1.4. The current Department of Energy Accounting system does not record Federal labor hours by project. This system capability will be provided by the new payroll system scheduled for implementation in the first quarter of FY 2004.

8.2. **Criterion # 23:** Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

8.2.1. ☑ **The individual I-MANAGE Project Management Teams should analyze performance reports and analyze any significant variances. The threshold for variance analysis will be documented in the individual projects' EVMS plan.**

8.2.1.1. In general, any schedule variance of greater than + / - 5% of the milestone level activities will require variance analysis.

[13] Section 3.7.1, ANSI/EIA 748-A-1998

8.2.1.2. In general, any schedule variance of greater than + / - 20% for a single project sub-task should be reviewed within the project to determine the root cause.

8.2.1.3. From a project management standpoint, the criticality of specific activities should be considered in this analysis. Critical path activities may delay the entire project, and thus, should receive more attention if negative schedule performance is indicated.

8.3. **Criterion # 24:** Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

8.3.1. ☑ **The I-MANAGE Program Office should provide guidance on policies and procedures for variance analysis and reporting of indirect costs.**

8.3.1.1. All costs currently associated with contractor activities are direct.

8.3.1.2. The contract does not allow for any indirect costs, with the possible exception of Task Performance Objective 3111: ODC Travel. However, it is recommended that this travel be linked to specific deliverables within the detailed WBS, and reported accordingly.

8.4. **Criterion # 25:** Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.

8.4.1. ☑ **The individual I-MANAGE Project Management Teams should ensure that the aggregation and summarization of earned value performance is easily accomplished through the use of the WBS and OBS structures, and any summary level reporting requirements are satisfied.**

8.5. **Criterion # 26:** Implement managerial actions taken as the result of earned value information.

8.5.1. ☑ **The Project Management Team for each I-MANAGE Project should establish policies and procedures for corrective actions to be taken when earned value performance thresholds are exceeded.**

8.5.2. When a variance exceeds the limits established by the individual project team, project managers must determine what is causing the variance and decide if the variance requires corrective action.

8.5.3. If the schedule variance corrective action is relatively minor, it may be documented on the Variance Analysis Report in the field provided on the EVMS report. However, if the corrective action is more detailed, a separate corrective action report should be completed.

8.5.4. If corrective action is required, it is up to the discretion of the DOE project manager as to whether a project schedule or budget change request is necessary, or if the variance can be absorbed within the existing project schedule or budget. If a change request is necessary, it is submitted through the standard change control procedures as defined in the Project Change Management policies and procedures.

8.5.5. Minor variances will be absorbed into project through schedule changes or shifting of project resources.

8.5.6. ☑ **The I-MANAGE Program Office should review summary earned value management variance reports and notify the individual project team's of any proposed or approved corrective actions.**

8.6. **Criterion # 27:** Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.

8.6.1. ☑ **The I-MANAGE Program Office should establish a schedule for submission of forecast reports on project estimate at completion based on performance to date.**

8.6.1.1. Typically, this would take place at the end of each major project phase, or at a fiscal or quarter year end.

8.6.1.2. This may be necessary for resubmission of the Exhibit 300 for the given project.

8.6.1.3. Issues with the annual budget cycle may require this estimate on an ad-hoc basis.

8.6.2. ☑ **The Project Management Team for each I-MANAGE Project should provide forecast reports for project estimate at completion based on performance to date.**

8.6.2.1. The formula for estimate at completion is documented in 3.2.6.

8.6.2.2. This formula ensures that the total estimated cost to complete is adjusted based on prior project performance.

9. Revisions and Data Maintenance

9.1. **Criterion # 28**: Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the program organizations.

9.1.1. ☑ **The Project Management Team for each I-MANAGE Project should ensure that any requested changes to project schedule or budget are administered according to the Project Change Management Plan.**

9.2. **Criterion # 29:** Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

9.2.1. ☑ **The Project Management Team for each I-MANAGE Project should develop a cross-walk to reconcile the current budgets to prior budgets at a level required by I-MANAGE Program Management.** For contractors, this would normally be a standard process for modifying the existing contract or purchase order and would be included as part of the history and supporting documentation of the purchase order modification..

9.3. **Criterion # 30:** Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.

9.3.1. ☑ **The Project Management Team for each I-MANAGE Project should ensure that any requested retroactive changes to project actual costs, earned value, or budgets are administered according to the Project Change Management Plan.**

9.4. **Criterion # 31:** Prevent revisions to the program budget except for authorized changes.

9.4.1. ☑ **The Project Management Team for each I-MANAGE Project should ensure that any requested changes to a baselined project budget are administered according to the Project Change Management Plan.**

9.5. **Criterion # 32:** Document changes to the performance measurement baseline.

9.5.1. ☑ **The Project Management Team for each I-MANAGE Project should ensure that any requested changes to the performance**

measurement baseline are administered according to the Project Change Management Plan.